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ABSTRACT

Reading research and reading instruction can each be grouped in two distinct categories, depending on the assumed source of control for the particular reading act that is studied or taught. "Outside-in" theorists view the reading process as beginning with print and ending with some representation or interpretation inside the brain, while "inside-out" theorists perceive reading as a highly discriminative process that begins in the brain and ends with selective attention to only part of the printed text. Although outside-in theorists clearly dominate both research and practice, their theories fail to account for such factors as intention, selectivity, prediction, and comprehension. On the other hand, so little is known about the functional information processing functions of the brain that inside-out theories remain vague in their descriptions. The use of computers to simulate and test hypothesized language and thought processes has helped inside-out theories to a degree, but those computer assisted studies retain outside-in biases. Before the reading process can be understood--and effectively taught--further research must attack the inside/outside problem without the biases of either. (Discussion following presentation of the paper is included.) (RL)

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Conflicting Approaches to Reading Research and Instruction

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CONFLICTING APPROACHES TO READING RESEARCH AND INSTRUCTION[1]

Frank Smith

My theme will be that there are two quite distinct ways of conceptualizing reading, but that one of these perspectives tends to predominate when reading is considered from an experimental point of view. As a result, there is a critical bias in reading theory and research that has been extended into a bias in classroom practice, a bias that limits and possibly distorts the way many people think about reading and reading instruction.

The greater part of this paper will be concerned with the cause, nature and consequences of this bias, first in reading theory and then when theory is "translated" into practice. But I want to conclude with a few general cautions about the application of theory to practice and some remarks about other issues which have tended to be of lesser concern in reading research but which may in fact be of major relevance to reading instruction.

Opposing theoretical approaches to reading

Although there are numerous theories of reading, they can in general be grouped into two distinct categories, depending on where the source and control of any particular reading act is presumed to lie.

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[1] Paper prepared for the Conference on Beginning Reading Instruction, University of Pittsburgh Learning Research and Development Center, May 1976.

Many theories see reading as a process that begins with the print on the page and ends with some representation or interpretation inside the brain - I shall call such theories outside-in. The other class of theories perceives reading as a highly discriminative process that begins in the brain and ends with selective attention to only part of the printed text - I shall call such theories inside-out.

Outside-in theories are clearly dominant in both the research literature and instructional development. They are characterized by the notion that everything on a page of text is "processed" and that reading is primarily a hierarchical series of decisions - first letters are discriminated, then they are synthesized into words (usually but not always through "decoding" into a phonological or "underlying" level of spoken language) as a consequence of which comprehension takes place. It would be invidious to identify one or two of these theories and I have neither the space nor the inclination to list them all. Examples proliferate in such recent compilations as Kavanagh and Mattlingly (1972) and the final report of the USOE Targeted Research and Development Program in Reading (Davis, 1971). They also account for a large proportion of the studies reported in Reading Research Quarterly and predominate in most psychological and linguistic speculation about reading. Outside-in theories are frequently detectable from a distance by virtue of their elaborate flowcharts, with arrows leading from the "stimulus" of print through iconic storages, scanners, comparators and decoders into destination boxes labelled "semantic store" or quite

simply "meaning".

There is in fact no evidence that any reader pays attention to every letter - or in many circumstances to every word - in any natural reading situation. Neither eye-movement studies nor analyses of oral reading indicate just how much or how little of the actual print readers "process" when they are reading meaningful text, although it is obvious that readers often identify words without attending to all of the letters on the page, and that they can also make sense of text without identifying all of the particular words in front of their eyes. Almost all of the experimental work that has provided the conceptual basis for outside-in theories of reading has been done with tachistoscopic equipment and meaningless materials in unmotivated laboratory situations.

My main criticism of outside-in theories is not so much that they are wrong as that they are not representative. They provide reliable and replicable data about how individuals respond when confronted with atypical "identification" tasks in laboratory settings, but in fact bear little resemblance to what takes place when individuals normally read street signs, telephone directories, labels, menus, newspaper reports, poetry, or anything else that is interesting or informative to them. More specifically, outside-in theories fail to account for intention (we usually read for a purpose), selectivity (we attend only to what we want and need to know), prediction (we are rarely bewildered or surprised by anything that we read), and comprehension (we are rarely

aware of the enormous potential ambiguity, both syntactic and semantic, of the most common words and constructions of our language). It is invariably easier to read texts that are meaningful than nonsensical strings of words, just as letters in words are easier to identify than letters occuring randomly - in fact we are normally only aware of words when meaning fails and we attend to letters only when words are unfamiliar, the reverse of the outside-in view. Of course, the fact that readers are usually aware only of meaning does not logically entail that they are giving no attention to letters and words in the process. But on the other hand the absence of direct or introspective evidence is hardly support for the outside-in point of view.

This pervasive element of outward control in meaningful reading is not something that outside-in theories can cope with simply by appeal to specialized "filters" or by the introduction of additional arrows pointing upstream in their flowcharts and labelled "feedback" or "prediction". Nor can such theories assert that the reader looks for and processes "higher order invariances" or "largest meaningful units" without acknowledging that what determines the size of a unit is not the nature of the print on the page but the intention of the reader in the first place, an inside-out perspective.

The inside-out view in fact begins with intention - it regards reading as a truly active, centrally motivated and centrally directed process in which the reader hypothesizes, or predicts, among a certain range of meaningful likely alternatives, and searches and analyzes among

the featural information available in the print only to the extent necessary to resolve his remaining uncertainty. The inside-out view endeavors to account for how words can be identified without the mediation of letter identification (the reader searches for features to decide among alternative word possibilities independently of a feature search to identify letters). It tries to explain why letters in words are easier to identify than letters in random sequences and why words in meaningful sequences are easier to identify than random words. In each case a set of expectancies is established reducing the number of alternatives considered by the reader and based upon prior knowledge. The reader looks for the featural information that he needs and ignores information that is irrelevant or redundant to his purposes. The inside-out perspective does not require recourse to spoken language for the comprehension of print. Meaning is directly accessible through print (as exemplified in the visible difference in meaning between their and there) and in fact must be determined before text can be read meaningfully aloud. Without prior comprehension, many words cannot even be allocated a grammatical function - for example is house a noun or a verb? - let alone an appropriate pronunciation or intonation.

Inside-out theories are by no means adequate, of course. Indeed, when one considers the enormity of the attempt to understand how knowledge of the world is organized and integrated in the human brain, which is the beginning of the inside-out analysis of reading, then one comprehends why it has been asserted more than once that to understand reading would be

the acme of a psychologist's achievement (Huey, 1908; Neisser, 1967). But the acme of a psychologist's achievement is surely not a series of reaction time studies measuring how long it takes individuals to name letters and words. Gough (1972) acknowledges the root of the problem when he characterizes the end-point of his outside-in theory of reading as "The Place Where Sentences Go When They are Understood", reached by a procedure that he leaves in the hands of a wizard-in-the-head named Merlin. Such a magical approach cannot explain why readers remain unaware of letters or even words in the process of understanding sentences nor why they are also unaware of potential ambiguities and even of the meaningful mistakes which from time to time all readers make. (These and other inside-out arguments are elaborated in Smith 1971, 1973 and Smith and Holmes 1971). Normal reading seems to begin, proceed and end in meaning, and the source of meaningfulness must be the prior knowledge in the reader's head. Nothing is comprehended if it does not reflect or elaborate upon what the reader already knows.

It can rightly be objected that inside-out theories are vague. But not enough is known about the way individual human knowledge is organized to provide a basis for more than cautious speculation (for examples and summaries, see Anderson and Bower 1973; Tulving and Donaldson, 1972). On the other hand, outside-in theories do not get very far in. Can "reading" really be studied if it stops short of comprehension?

Apart from the conceptual conundrums confronted by inside-out theories, they are also handicapped by the difficulty of designing

"critical" experiments. Because of their scope and the inherent problem of exercising laboratory control in situations where the major variable is something as unpredictable as an individual's prior knowledge and intentions, very few experimental paradigms for comprehension lend themselves to simple replication or quantitative analysis. Even the most compelling studies of language comprehension (such as Bransford and Franks, 1971) can be regarded only as illustrative. Most of the data relevant to inside-out theories of reading and language comprehension are based on anecdote, observation or introspection - but so then are many of the studies upon which today's powerful theories of spoken language acquisition are based.

Conversely, I think the dominance of outside-in theories in the research literature is entirely attributable to their conceptual simplicity and experimental tractability. It is far easier to design replicable experiments, conduct statistical analyses and achieve reliable results when the concern is limited to reaction times to meaningless letters and words. When subjects succeed in imposing meaning on such tasks - by relating the stimuli to something they know beyond the constraints of the task - the well-ordered predictability of results breaks down. Meaning makes such tasks easier for subjects but harder for experimenters, thus the need in most outside-in studies of reading for the subject to be the most unrepresentative of all readers, an individual with no relevant prior knowledge or expectations about the task at hand.

Such essential nonsensicality in outside-in reading research mirrors the 100-year study of nonsense in experimental psychology's in-

investigation of "verbal learning". Since the invention of the nonsense syllable, this investigation has been a constant battle between subjects striving to make sense of their tasks and experimenters trying to devise more effective nonsense, since it is only with nonsense that psychology's venerable "laws of learning" apply (Smith, 1975a, Chapter 5).

Preoccupation with the alphabetic nature of the particular written language with which they are usually concerned is a marked characteristic of outside-in theories. Reading is frequently seen as simply a matter of "decoding" these alphabetic symbols into sound by the application of spelling-to-sound correspondence rules, although the theoretical or empirical necessity for such decoding in normal reading (as opposed to laboratory studies of word recognition) is rarely explained. Many experimental situations indeed leave no alternative to spelling-to-sound correspondences since the stimuli include sequences of letters that are either nonwords or only parts of words. Occasional specific justification for the assumption of decoding tends to argue its necessity for learning to recognize unfamiliar words in the first place (which may be referred to as the identification problem) or a need for some form of phonemic mediation to relieve an assumed memory burden of storing many thousands of unique configurations in the reader's sight vocabulary (which may be termed the recognition problem).

Inside-out theories on the other hand tend to ignore or downplay the relevance of decoding. They assert that the system of correspondences is extremely complex and of limited reliability for word

identification, and that in normal reading situations there are alternative strategies (like asking someone, or using context) that are less time-consuming, more efficient and already well-practiced in spoken language learning. For word recognition - the maintenance of a sight vocabulary of familiar words - decoding is regarded as completely unnecessary since there is no known limit on human memory capacity, readers of non-alphabetic scripts do not appear to have memory problems and individuals seem to experience little difficulty in discriminating all the thousands of distinctive objects in their perceptual worlds without the need for mediating systems. Inside-out theories assert that the memory-load argument confuses recognition with reproduction, which is the writer's problem, not the reader's. In a general discussion of all these points, it has been argued (Smith 1973) that the alphabet may function primarily to assist the writer. The inside-out approach sees as the reader's primary overload problem the fact that he may be confronted by too many alternatives - letter combinations "decode" into too many alternative patterns of sound, and many common words have too many alternative meanings and even grammatical functions, (e.g., house, chair, table, empty, time, narrow, open, close). Reducing the number of alternatives in advance by excluding unlikely instances accounts for the absence of awareness of potential ambiguity, and also makes spelling-to-sound correspondence rules effective in practice. This process of employing context and prior knowledge to eliminate alternatives in advance is sometimes termed prediction (Smith, 1975b), to avoid the educationally-loaded term

"guessing" by which inside-out theories have sometimes been interpreted.

Conflicting approaches to reading instruction

There are also outside-in and inside-out approaches to reading instruction. Outside-in programs are founded on the general belief that a child must first learn the alphabet and then the "sounds of letters" which can be combined to form words that hopefully he will recognize as part of his spoken language. And that - from the outside-in point of view - just about accounts for learning to read. Typically if a child fails to learn to read by such treatment, he is given more of it.

One reason that outside-in instructional programs are so numerous and widespread in classrooms (and at reading conventions) today is that they are a direct reflection of outside-in theories of reading. Outside-in theories "translate" naturally into outside-in instruction. But outside-in instructional programs are also prolific in their own right for the same reason that outside-in theories flourish - they are conceptually simple and lend themselves easily to measurement, manipulation and control. With outside-in instruction there is little concern with comprehension on the part of the child, either in terms of content or in terms of why he should be involved in the exercise in the first place. Comprehension of content is supposed to come about automatically if and when the child masters decoding skills, and is in any case the child's responsibility. Comprehension by the child of the purpose of the drills and skills is disregarded ; task achievement is everything. And not only are outside-in instructional methods frequently successful -

within their own limited range of objectives - but they have the great advantage of being able to demonstrate their success. Objectives can be set within the reach of any desired proportion of a particular population, and scores can be recorded to prove that criterion levels have indeed been achieved. By offering a convenient scale of scores, outside-in procedures will even "diagnose" which children are likely to be good students (i.e., will score high on similar tasks) and which children have learning disabilites.

The outside-in perspective is a boon to instructional program developers who need to break down complex tasks into series of discrete and simple steps, so that teaching can be standardized and made amenable to technology. To achieve this simplification a few contemporary reading programs claim to teach only "subskills" of reading, relieving the teacher of anxiety about whatever the total skill might be of which the subskills are a part. Because of their facile formulations and quantitative nature, outside-in procedures are generally adopted whenever someone wants to hold someone else "accountable" for progress or regression in literacy. Outside-in instruction is usually also the referent when there is concern for "getting back to basics."

Inside-out approaches to instruction, on the other hand, try to argue that children learn to read by making sense of written language; they learn to read by reading and the teacher's role is to help children read. (For a summary of these arguments see Smith 1973). Such a perspective asserts that it is sense that enables children to learn to read,

making use of inferred meaning and prior knowledge, just as the development of spoken language fluency is rooted in the sense children are able to bring to the learning situation (Macnamara 1972; Nelson 1974). According to the inside-out point of view, expecting children to "decode" letters into words is to expect them to learn words the hard way; it is familiarity with words that makes letter recognition (and phonics) easy. Similarly the requirement that children should identify strings of words accurately in order to obtain meaning, or without recourse to meaning at all, is also to impose the most difficult task. Anything that does not make sense to the child is regarded as a hindrance to his learning. Learning nonsense is not only harder, it is pointless.

The inside-out perspective appeals to the intuitions of many experienced teachers. Their own feelings - often tentatively expressed because they fear they lack "scientific" validity - are that children learn by being immersed in meaningful written language, in situations that generate pleasure and assurance rather than bewilderment and apprehension. From such a perspective, the more structured outside-in approach may be seen as a systematic deprivation of important information. But it must also be stated that other teachers are threatened by inside-out points of view, by their lack of structure, the responsibility they seem to throw on the teacher, and the fact that they are not amenable to simple packaging and measurement. They are not labor-saving. They are not explicit about what teachers should do, nor about how student progress would be measured.

Inside-out theories do not offer prescriptions for methodology. They are not directly translatable into practice (Smith and Goodman, 1971). Instead they aim to inform teachers, to assist them in making their own diagnoses and decisions. Teachers who rely on outside-in instruction may only be able to move from one program to another; they need advice, tests, or luck to make appropriate on-the-spot decisions. But the ultimate dilemma for such teachers is that they must still choose. They must select among programs, tests, and experts. And to make such choices they need information, an understanding of the nature of children and of reading. The inside-out perspective does not hold that reading teachers should ignore the tools of their trade, the methods and materials that are available, but it asserts that teachers should know how and when methods and materials are appropriate, and when their use may make no sense at all. Inside-out theory can be practical - but not be being strait-jacketed into programs.

"Interactive" approaches to reading

The relevance of prior knowledge and even of expectation in reading has of course not been completely overlooked by researchers. But it is only in recent years that experimental studies have attempted to consider such central factors in a comprehensive and systematic way. The impetus for such studies has come from a perhaps unexpected source - the use of computers to simulate and test hypothesized processes of language and thought. A number of cognitive psychologists and psycholinguists have begun to move away from rather narrowly constrained speculations of

visiting us would be represented by a logical argument of the form:

[RELATION: visit, SUBJECT: sister, OBJECT: us]

Since comprehension is assumed to consist of the construction of such an abstract representation, the adequacy of the representation (and of the model) is tested by whether particular parts of the input sentence can be retrieved in response to questions. For example, comprehension of the preceding sentence would be demonstrated if the element "your sister" could be retrieved in response to the question "Who is visiting us?"

But such formulations are far from competent to handle the fact that comprehension of statements is rarely a matter of being able to regurgitate or even paraphrase what has just been said or read, instead depending largely on the receiver's purpose in attending to the statement in the first place. For example, as a response to the question "Could you put me up for a few days?" the statement "My sister is visiting us" means only one thing - "No" - and it would normally be comprehended in that way.

Put more generally, speakers and writers do not normally produce statements in pointless context-free isolation but with respect to an actual or assumed common interest on the part of both producer and receiver. The actual meaning to both parties is largely determined by factors extrinsic to the statement, namely the situation in which it is uttered and the prior knowledge and mutual expectations of the two parties concerned. Comprehension is basically a matter of getting answers to questions implicitly asked by the recipient of a message (Smith, 1975b). The ability to paraphrase an utterance, or to recall parts of it,

how language-based knowledge might be represented in memory to a more elaborate study of reading.

To take just one example, Rumelhart (in press) has characterised reading as an "interactive process" involving a conjunction of "visually derived" and "expectation derived" information. Rumelhart and others have adopted computer terminology to refer to the flow of visually-derived information (corresponding roughly to what I have been calling outside-in) as "bottom-up", and to the opposite flow of expectation-derived information (my inside-out) as "top-down". Apart from some general background theorizing, however, the studies that have been so far reported have tended to get no further in (or up) than word recognition, and have once more typically allowed subjects little opportunity to demonstrate preferences and strategies they might exhibit in reading outside the laboratory. The visually-derived information still presents itself to the reader for exhaustive analysis of one kind or another, rather than the reader sampling it selectively for purposes of his own.

One reason that the interactive approach has in general been unable to break free of an outside-in bias in experimentation is that it has tended to lean on an extremely narrow conception of comprehension that characterizes computer-based models of language. Inspired largely by "case grammar" linguistic theories (e.g. Fillmore, 1968; Chafe, 1970), such models have been inclined to regard comprehension as a kind of abstract representation (generally in the form of a network of relations) of all the information contained within the structure of an "input sentence". For example, the "meaning" of a sentence such as My sister is

is no indication of comprehension at all. Yet parsing or paraphrasing are generally the most that computer models of comprehension aspire to achieve, and until further progress is made in the enormous enterprise of trying to represent human knowledge and intentionality in these models it is unlikely that they will provide a basis for theories of reading that are representative of normal reading situations.

Until interactive approaches break free of their dependence on outside-in experimentation and enrich their theoretical foundation with respect to comprehension, expectation that they might have productive implications for classroom practice or instructional development would seem to be premature.

Directions for further research

For a start, it would be pointless to expect a critical experiment to determine whether outside-in or inside-out theories are correct. The data are rarely in contention and the interpretation placed upon them depends on the theoretical proclivity in the first place. The issue is a pragmatic one; deciding which particular theories are the most useful for specific purposes, whether predicting response latencies in letter or word recognition studies, providing an intuitively appealing model of reading, generating worthwhile practical consequences in classrooms, or stimulating productive research. Obviously all theories of reading and of reading instruction require improvement and offer ample potential for research. But there is a particular need for more robust theories to stimulate research beyond the current rather tired experimental preoccupation with word identification and the seemingly endless

and inconclusive comparisons of scraps of instructional technology.

In particular a better understanding is required about how and why children learn to read in the first place, and it is unlikely at present that such an understanding will come from rigorous experimentation under controlled laboratory conditions. There is a dearth of observation capable of throwing light on the intellectual, emotional and social needs that reading satisfies - or why learning to read is often resisted. There is a need for more information about the manner in which children respond to print long before they receive any formal instruction, and of the amount and nature of print in the world around them, analagous to the studies of the spoken language development of infants. Very few studies of reading development have been conducted that have not been contaminated by the effects of early instruction or that have been concerned more with children's developing awareness of print than with their ability to cope with the demands and terminology of particular instructional methods.

Further pursuit of a universal method of teaching reading might appear pointless. A mass of existing research demonstrates that all methods of reading instruction achieve certain aims some of the time though no method has been found to work all of the time. Millions of children have learned to read with precisely the same procedures and materials with which other children have failed. There is in fact no evidence that children who are motivated to learn to read experience difficulty in learning to read. And despite the millions of dollars

spent on program development and testing by government agencies and commercial enterprises, there is not the slightest evidence that children who succeed in learning to read today do so with any more facility than those who learned with a hornbook and the family Bible.

More consideration must be given to the possibility that literacy problems will not be ameliorated by better descriptions of language or of cognitive processes. For example, a largely neglected theoretical issue that may play a considerable role in the apparent inadequacy of much of our reading instruction is the fact that language as it is normally encountered and employed outside the classroom has a variety of functions (Halliday, 1973). Children do not begin life by learning "language skills" as such, they are never engaged in a purely linguistic exercise. The language they first hear and use always has a function, and language and function are probably learned simultaneously. Children learn to talk while learning that language can be used to satisfy needs, express feelings, explore ideas, ask questions, obtain answers, assert themselves, manipulate others, and establish and maintain specific interpersonal relations. But a child may seem to have learned language - in the sense of having some ability in one or two functions - without comprehending all its functions. Sometimes children may seem to have inadequate language when what they lack is experience in certain functions of language.

Language in school must often seem to children to have some very odd functions. Sometimes it is used without any obvious function at all, for example when children are expected to attend to isolated

words on chalkboards, meaningless sequences of words in books, and obscure exercises and drills. Some functions of language that children find most important schools may attempt to suppress entirely, both in teachers and in children. There is very little theorizing and research on these issues, yet as far as literacy is concerned they may have the most profound implications of all.

Concluding comments

There are two other reasons why I feel caution should be exercised before acceding to the constant demand for theoreticians to be "practical" and for the translating of research into practice. The first is that the direct conversion of theoretical insights into practical terms - whether on the level of helpful hints to individual teachers or as fullblown instructional programs - tends to lead to egregious over-generalization. What might be a good idea with a few children in a limited context becomes inflated into a foolproof system for teaching entire populations the whole time. Teachers who rely on experts rather than on their own accumulated wisdom and experience to solve day-to-day classroom problems become even more disappointed and disillusioned with the theorist or researcher when the desired improvement so rarely comes. More recognition should perhaps be given to the value of theories that assist teachers in making their own decisions.

My second concern is that the rush to be applied frequently confuses what a person is able to do as a consequence of being a reader with what is necessary in order to learn to read in the first place. A recent example was the effort to transmogrify large numbers of children

into transformational grammarians when linguists discovered that transformational rules were a convenient way of characterizing part of their own language competence. Almost contemporaneously, many children were drilled in the identification of meaningless "distinctive features" as a preliminary to exposure to the alphabet after theorists hypothesized that feature detection models might be a useful conceptual tool for examining letter and word recognition processes. Following recent theoretical interest in the roles of redundancy and prediction in reading there have been attempts to develop programs for teaching children to become responsive to redundancy and to predict, although such abilities might seem integral parts of the natural capacity of all children to make sense of spoken language long before they get to school.

No theory of reading is likely to be of substantial utility in education unless it reminds teachers and researchers alike that the skill of reading remains largely a mystery because so much of it is embedded in the complex structures and functions of the brain. To discover why some children succeed and others fail we must understand more about what transpires in their heads as they strive to make sense of reading and reading instruction.

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May 20--P.M.

OPEN DISCUSSION OF F. SMITH PRESENTATION

ELLSON: Would you like to say something about a relationship between your dichotomy and what has been called the synthetic and the analytic approach to reading instruction?

F. SMITH: I will, if you will explain a little more what you mean by the analytic approach to reading instruction?

ELLSON: You said that one way to teach reading is to start with the elements and synthesize more complex things. The analytic approach is to start with, for example, meanings, or large units, and then break them down into smaller units.

F. SMITH: I don't like to make any statement at all about reading instruction, because of this risk of overgeneralization. But, if you ask me how reading is learned, as opposed to what children do as a consequence of instruction, I would say it's on an analytical basis: going down from making sense, to identifying words, and then to identifying letters.

ELLSON: But you did say that most of the methods are going in the other direction.

F. SMITH: That's right, the methods are going in the other direction.

VOSS: Speaker requested that his comments be deleted.

F. SMITH: This is written? This request is written?

May 20--P.M.

VOSS: Speaker requested that his comments be deleted.

F. SMITH: Oh, yes, there is always a problem. There are always problems.

When a child who is reading from the inside-out comes across a word he has never met before, that child has a problem. The question is: How is he going to solve the problem--by using analytic techniques or synthetic techniques or by asking somebody, as in the case of the apple. So instead of asking for an apple, the child now says, "How do I write the word apple?"

ELLSON: Doesn't it follow that what you are calling the outside-in, or the bottom-up approach to reading is really something that occurs early in learning to read, and that you see it as biased in this direction because most of the research has been done on the first three years, so that the emphasis has been on teaching new words, new ways of using sounds to get these new words. If, in fact, more research were done in the sixth, seventh, and eighth grades, you would find many more inside-out types of things, knowledge structures and understanding.

F. SMITH: I would like to think it does, but it doesn't work that way. As I said, one of the things that characterize high-school students with reading disabilities, as far as I have seen in my experience, is the fact th meaning is the last thing they pay any attention to at all. It is not the fact that they haven't learned anything in school, but the fact that they have learned too well. They've been lead to believe that if you get the letters right and the words right, then the meaning will take ca.e of itself. I am not sure whether you are talking about the way we teach reading or the way in which children learn to read. This is a flip thing to say, but I think that children learn to read

despite what we do in schools I don't see the relevance of a great deal of what we do in schools. I think the really important problems in learning to read, in making sense of print, are not problems that are solved by giving children spelling-to-sound correspondence rules or even by telling them what rules are.

CAMBOURNE: Did I understand you correctly? Did you degrade observational research by calling it anecdotal?

F. SMITH: No, I had two categories. I said anecdotal and observational, although the dividing line between the two would be hard to draw. I am very keen, for example, to see what Marie's observations and techniques are.

CAMBOURNE: My feeling is that observational research can be just as rigorous as any other.

F. SMITH: Yes, it can be. It depends on what you are looking for. You can be narrow in what you are looking for in children, or you can be broad, and, in effect, let the children determine the categories.

JACKSON: Do you see any relationship between research and instruction? I get the feeling, from what you are saying, that you see research over here, and you see classroom instruction over there, and you really don't see a viable relationship existing. I think that relationship is the purpose of this conference.

F. SMITH: It depends on what kind of research we are talking about. Do we mean research into the reading process, the kind of thing that Ed has been talking

about, or the research related to what goes on in schools? As far as research into what goes on in the schools is concerned, I'm not sure, because usually you get answers to the questions you are asking; if you are not asking the right questions, you are not going to get very much insight.

As far as research into the reading process is concerned--which is the research that I ally myself with--I don't see that that can be translated into classroom practice.

What I do feel is necessary is that results of reading research be made comprehensible to teachers. I think Marie has the point--I don't know if she actually said this, but it was in her abstract--that teachers have to be experimenter-practitioners. Teachers get information in the classroom in any case. They get information from what the children are doing, if only they can read it properly. They get information by looking for the implicit theories in any instructional program, if they wish. All instructional programs are based on some kind of a theory, whether or not the theory is made explicit.

The other kind of information that teachers need is precisely the kind of information that researchers can give them. That is information that teachers evaluate and make use of. It is not information that is translated into materials that teachers use directly.

WEAVER: You talked about the need for readers to make sense of print. To paraphrase what Shirley Jackson said, there is little connection, at this point, between research and practice, yet I recall that in one of your earlier books you said that what teachers need to do is understand that the proficient reader samples a minimum of visual cues; that what teachers of beginning readers need to do is facilitate that sampling process. You also mentioned that you don't

like to make generalizations. To say that teachers should facilitate visual sampling is extremely general. How can you relate that to teaching children to make sense of print. How might they make sense of print, without either giving them some systematic understanding of spelling-sound correspondences and/or telling them what a particular word is?

F. SMITH: I never said don't tell a child what a word is. In fact, I have usually argued the reverse: If that is what is stalling the child, then tell the child; don't expect him to figure it out. I try to be positive, so I might, in fact, have talked about facilitating. But generally I have argued that teachers should avoid interfering with particular things. I don't normally think that sampling or predicting or any of these things that I think are critically involved in reading have to be taught. I think these are things children do. Certainly, if they have spoken language, they have demonstrated that they can do this. In reading instruction, we have to avoid interfering with what kids can do.

WEAVER: I guess when you referred to prior knowledge, you meant that what is an already developing knowledge base for children is not to be interfered with by instruction. If you were to put me in a country that used an orthography that was different from my own alphabetic code, you wouldn't expect me to be able to figure out the usage rules of that code. Instead, you would expect that if I had had some exposure to it, some prior knowledge, some conditioning, perhaps, if someone says, "That label says, 'cornflakes,' and 'Pass me the cornflakes,'" that I might learn the word for "cornflakes." But I see that as a quantum leap from the kind of very complicated translation from print to some form of speech that a child is asked to do at the very beginning stages of reading.

F. SMITH: It is a question of whether you are coming in from the point of things that children can understand, which tend to be general, or from the point of view of things that children can't understand, for example, letter-to-sound correspondences and then hope eventually the child will figure out this has some kind of meaning to the world in general.

WEAVER: What would you do with those students who didn't figure it out on their own?

F. SMITH: Assume as a general principle--although it is not one--that I want to make a theory of teaching reading. As a general principle I would say do the child's reading for him, to the extent he can't read, and that means reading anything, like "No smoking please," or "stop." If the information is of any use to the child, he will make use of it. If he wants more, he will ask you for it or indicate he needs it. On the other hand, if it is not useful information, he will ignore it. One of the problems in school is that we don't allow children to ignore things that they can't make sense of or things that they find unimportant.

CLAY: I guess I am usually trying to put together things people split apart, and I react a bit to the reading researchers, on the one hand, and to classroom teachers, on the other. I would normally demand of my research that it have a payoff on both sides at once, and that depends on the kinds of questions I ask in research.

F. SMITH: You made a statement, not an argument.

CLAY: You seem to be implying that these two things differ.

F. SMITH: Yes, I am clearly very much against anything that encourages teachers to use even less judgment than they do currently.

Most of what a child gets from reading, the real insights into reading, he gets outside the school. What we should try to do in school is build up on the insights children have. It is very hard, in fact, to give children insights in school, the kinds of insights they need. I don't think what we do in school is sufficient to teach a child to read, and I don't think it can be. I think a child needs to have certain insights into the nature of print. And the nature of written language--incidentally, this is another reason why I am very much in favor of reading to children--has nothing whatsoever to do with the actual process of decoding words. The fact that the written language has different conventions makes it a different language from spoken language, and children need to know that. That helps them to read.

There are other things, too, that we couldn't possibly do in school, or at least not very well. The kind of print we see outside, on the cornflake package for example, is meaningful print; its meaning is predicted by the child before he even knows what it says. I think such things are important.

WHITE: I have a friend, who is a political scientist in Geneva. His child is in the Geneva schools, and I was interested to hear that in the Geneva schools, the big issue is if you are asked to do a 3/4-inch margin, you, by God, do a 3/4-inch margin. The schools, in general, are governed by ritual. There are routines and iron control. The child comes from an American school, where the teacher is terribly concerned that the child understand and make sense of the classroom, but the word I get is that the children love the Geneva system. I have the impression that little children like and respond very well to rituals. I have a

feeling that a great deal of traditional teaching works because, to some extent, little children don't need to make sense out of things nearly as much as adults do. You can, in effect, get away with drills, because they don't seem quite so tedious to children. Are you really arguing against the use of drills?

F. SMITH: No, I am not. I am arguing that what teachers should be alert to, and respond to, are signs of confusion, signs of inability to comprehend. I think we should have more research into how, in fact, people do learn to read, quite apart from the instructional things, because, as I am fond of pointing out, most of us learned to read in classrooms with 35 desks screwed down to the floor, bad reading materials with sanctimonious content, and very authoritative teachers. We learned to read. As I said in the beginning, I don't see that the solution to the reading problem in schools lies in better programs of instruction or in better theories of the reading process.

VENEZKY: Frank, in your introductory remarks, you said, among other things, that literacy won't be improved by better theories of reading or language. But then after you proceeded for about 40 minutes to tell us what a plague on the house of reading the current theories were, you hawked a new theory. Now, is there a contradiction here, or am I missing something?

F. SMITH: I think what I said, or what I was trying to say, was that if we expect better theories of reading and better theories of reading instruction to be translated into programs, then we are going to miss the point altogether.

On the other hand, I was also trying to say that when teachers are well informed--and that means informed about everything, not simply about theories of reading--they are better teachers. I would say that any insights we can get into

reading are grist for the mill of teacher understanding. I think that being involved in theorization and research and in trying to make theory meaningful to teachers is a worthwhile procedure. On the other hand, I don't think we are going to solve problems of illiteracy by translating the theory into programs. I'm saying two things at the same time and I don't think they are contradictory.

E. SMITH: Let me just see if I have something straight. You are thinking of inside-out, of coming from the head. Don't you have to have the other kind of process, too, outside-in? It can't just be all inside-out; that is like an hallucination.

F. SMITH: Inside-out theories do get out; they do get to the stimulus. Let me give you one example. When you look up a telephone number, there is very precise control over the stimulus, over your selectivity. You look for the person's name. If you are subvocalizing, you are not subvocalizing the name you are reading; you are subvocalizing the name you are looking for. That's what you hold in your short-term memory, the name you are looking for. When you have the last name, you check back into long-term memory for the first name, and perhaps, if it's a name like Smith, you check for the address as well. At that point, you empty everything out of short-term memory, and what you put in there is the number you read. You are extremely selective, and, in a general sense, you don't read all of the other stuff there.

E. SMITH: I would agree with that, but you are still taking in some of that visual information.

F. SMITH: Of course, you are taking in the visual information that you are

looking for; you are taking in the visual information that you want, but you are not processing all of the visual information that is in front of you.

Recess

May 20--P.M.

COMMENTS BY DOUGLAS ELLSON

RESNICK: I would like to ask Doug Ellson to tell us about some of the programs he has been looking into.

ELLSON: For the next few minutes, I may sound like a voice from the past. That is not necessarily bad; we might be able to learn from experience. I want to talk about something that, from what I have heard and read so far, is being missed by this group. Another way to introduce this is to say that it goes on very nicely from where Frank Smith left off. I agree very much with most of what Frank says, but I think he is dead wrong on one thing, and that's partly why I am here. He said, as I understand, that theory doesn't or shouldn't--I'm not sure which--lead to practice. What I am going to talk about are some examples of how theory has led to practice.

Frank is not alone in his point of view. I would like to quote from a document, which all of you received. I believe it was written by Lauren Resnick and Phyllis Weaver. They begin by talking about the choices in reading, the social problem, and so on, that I am sure we are all well aware of. Then they say, to quote, "This crisis in reading exists despite a long history of research and experimentation on reading, the history that goes back to at least the beginning of this century. As a result of this research, scholars are able to describe in considerable detail, and with some degree of consensus, many of the skills and processes involved in reading. Yet most reports of this research conclude only with a request for additional research to clarify some points of theory. The results of the research, in other words, have not been used to offer strong suggestions for instructional practice." I think this is generally true, but there are some examples which I have become interested in recently, ways in

which the relationship between theory and practice has had an effect on beginning reading instruction.

Very briefly, these are 13 studies, all of which are reasonably well, I would almost say very well designed so that we can have considerable confidence in the results. All of them are concerned with evaluations of techniques or programs for reading instruction, which were compared with a control group. In every case the control group was a sample of conventional teaching. In every case there was some objective measure which indicated that the innovation was better. The ratio between the two measurements was at least 2:1. In other words, these techniques were in a sense twice as good as others, in terms of some objective measure.

How many of you know of <u>any</u> evaluation studies in which there is a comparison between an innovation and conventional teaching and some measure shows that the new measure is at least twice as good? May I ask which one you have? I am looking for new ones.

VENEZKY: Well, there are at least ten <u>ITA</u> studies, and there are several <u>Uniphon</u> studies, but if you ask me if we should believe the data of these well controlled, worthwhile comparisons, then it would be a different question.

ELLSON: I guess there are hundreds of them, most of which would not satisfy methodological criteria. The ones I am talking about, I am not sure about completely. Some I have not yet been able to get the original sources; they are hard to find. Incidentally, I did not include the ones you are mentioning, so I would like to get a lead to them before I leave.

I started this search accidentally, as I was learning something about the field of reading. I ran across a few studies with results that looked spectacular and yet did not make me feel unhappy about the way they were done, so I started to look consistently for studies in which there was a large difference. I defined a large difference--an educationally significant difference--as one in which the ratio was two to one or larger. That is not the best criterion I can think of, but it is one on which it was possible get data.

The measures, incidentally, are achievement test scores--usually only in the first grade, which start somewhere near zero--or else achievement test gains. There are some which involve other measures, such as proportion of failures. Whether we can believe these absolutely or not, it seems to me that there is something here that ought to be looked at very carefully. Of the 26 studies I found, 13 were in the field of reading.

As I say, I used two criteria. One was that ratio of two or more, the other that they satisfied my fairly strict judgment as to methodological adequacy. A good many of these studies are clearly related to theory or theoretical concepts.

I have been listening very carefully to the other speakers here, and I am not quite sure what we mean by theory. In some cases I think we mean not much more than the translation of a description of a practical classroom situation into the language of the psychologist, the linguist, or some other scientist. This might seem to be a minor thing, but I don't think it is. When we translate the language of practice into the language of science, one thing that happens is that we are able to be more abstract. We can talk about more cases. We find that out new statements give us leads; they entail other statements that refer to experiments. This opens up a lot of experimentation that is relevant to the practical situation that we were talking about in the first place.

When I "apply data," I get to the data by this transformation from one language to another. As soon as I go from the practical language to the scientific language, I find that a tremendous amount of information becomes available for application. Incidentally, I would like to point out that this practice is not necessarily recommended for teachers; it does not necessarily help a teacher to translate her problem, her practical question, into the language of science. It will not help her unless this collection of other information is opened up to her, and most teachers are not well trained in this field. For example, in teacher training, how much actual time is spent on the psychology of learning or the psychology of reading? I have spent a lifetime in the study of one of these areas and a considerable amount of time on the other, so for me this technique works. To apply science to practical problems is a difficult sort of thing, and I doubt that it can be done effectively by most teachers. I think that it has to be applied by people who know the scientific literature very well.

Of my 13 studies, I would say at least half are fairly closely related to basic research data, but not necessarily to data in the area of reading. A significant chunk of them, five or six, are related to the psychology of learning or behavior theory, not particularly to reading.

In order to use this information to affect practice, we must use what we know about learning scientifically, and what we know about reading artistically; that is, what the practitioner knows. For application, this state-of-the-art information must be used in combination with the scientific information. That is one of the ways in which application takes place.

It is often said nowadays that nothing anyone does in the classroom makes any difference, nothing that is done by educational researchers makes any difference. If nothing else, these cases indicate that what is done can make a difference.

Suppose we look at these cases, and see what they contain that might be useful. I looked at them as carefully as I could to see what kinds of suggestions I would get, partly on how to teach and partly on how to establish a relationship between theory and practice.

If you wanted to find out something about flying, you might be interested in the Wright brothers. They were not really very successful; they didn't fly very far. But they are significant, because, at the time, they were all we had. So they were really worth looking at very carefully. We know that many things they did were wrong, but we learned a great deal from them.

In looking at these studies, I find that they provide evidence of very poor teaching by many of those who instructed the control groups.

One of the common features of the improved teaching is what may be called "delegation." In all but two of the 13 cases, the teaching is not done by professional teachers. It is done by nonprofessionals. In every case the pupil-teacher ratio is less than 30 to 1. The highest ratio in the group is 18 to 1 and there is one ratio of 10 to 1. All the rest are 5 to 1 or lower, down to 1 to 1.

In the cases where professional teachers are used, the teaching load is lowered; this decrease in the number of pupils is, of course, a form of delegation; or a good part of the class is passed to someone else. There are really two factors here. One is delegation, the other is the use of

non-professionals as teachers.

Another factor that is probably related to delegation, is individualization. In most cases it is not what is ordinarily called individualization, in which the content of what is taught is designed for the particular pupil. Individualization in most of these studies is provided in the form of feedback. After the pupil responds, the teacher reacts with reinforcement or nonreinforcement.

Another factor--which brings me back to Frank Smith--is that in many of the successful innovations the children seem to get more practice in actual reading than is the case in most classrooms. Little time is spent on telling the children about reading, in teaching them to verbalize the rules. Most of this kind of teaching involves giving the children practice in reading.

One thing of interest in reference to Frank Smith's paper is that four of these methods were inside-out and four others were outside-in. Frank suggested, among other things, that it is very difficult to evaluate the inside-out method. Now, here are four cases, where this method has been evaluated by the same kinds of criteria that have been used to evaluate the outside-in; that is, some kind of reading achievement measure. In connection with earlier discussion, it is of interest that three of the four outside-in methods were used in the first grade, and three of the four that were clearly inside-out were done in the fourth grade and above.

Someone suggested that we may need to use the outside-in methods to get children started. At the beginning we need to teach by synthetic methods. Later on the problem may be motivation; that is, once children have the basic skills, we can begin to emphasize motivation. From then on, let them read and put things

together for themselves.

I think that is about all that I want to say directly. It seems that there is some evidence, not yet much, to indicate that it is possible to accomplish the thing that this meeting is aimed at; that is, to apply theory to influence practice.

I think it would be useful to look carefully at one of these cases, or at all 13 to see how many are a direct consequence of application of theory. When we find those that are, we can ask how it was done. This is a difficult task. In psychology, linguistics, socio-linguistics, and social science--we have not done it very often. I think it would be useful to look carefully at the few successful cases that we have.

OPEN DISCUSSION OF ELLSON COMMENTS

RESNICK: Doug, have you written these up somewhere? Is there a bibliography of these studies that you can share with us?

ELLSON: I have not written them up. I have the bibliography of the 26 cases. If people want it, we can probably get it reproduced.

RESNICK: I think that would be the best thing to do.

ELLSON: I suspect I should label the ones that are in reading.

RESNICK: That would be very useful. If you send the bibliography to us, we can circulate it with the proceedings.

ELLSON: I also have something else that might be useful. It is a summary of the projects. In the summary, I tabulated characteristics of the successful methods and where to find the studies. The tabulations also include the subject that was involved in the teaching, the level at which it is taught, and in some cases the method--if there was a name for it--the pupil-teacher ratio, the qualifications of the teacher, the nature of the control group, the teacher-student ratios, and in some cases the measure that was used, the particular test.

WHITE: One of the complaints people have expressed about the AIR series, the later editions, was that when they went back to find exemplary programs, they found a distressing lack of "continual hit." A program that surfaced one year as meeting their criteria would not surface the next year. Do you have any data on the sort of sustained ability or continuation of this performance?

ELLSON: There is on one project, mine. Mine, because it is one of the few that have survived. One of the distressing things about this is that nobody has paid any attention to these projects. They have died; they haven't even been looked at, let alone supported, so that they could be continued, modified, or adapted so they would be better able to survive. In many cases, they have not even been repeated. In some cases, the analysis has been repeated, and it breaks down.

WHITE: Do you know the case study that Weber did a few years ago on exemplary programs? Was it a study for the American Council of Education?

LIBERMAN: The Council on Basic Education.

WHITE: This attempted to look at the programs that had a sustained hit record,

programs that were all in inner-city settings with disadvantaged populations. They had to hit, I think, two or three years in a row. I forgot what the criterion was.

VENEZKY: No, Weber only mentioned one year.

WHITE: But it was a continuous success criterion. I can't remember what it was.

VENEZKY: I don't think so, because Weber only measured third-grade reading in one year.

WHITE: Yes, he only measured one year, but he tried to measure more.

VENEZKY: That was the interview program.

WHITE: I am disremembering; he didn't have the criterion on continued success either. Okay. I will take it back. However, I would say some of Weber's criteria sound like yours, and others don't. He paid attention to the organization, to the way the staff morale was looked on, and so on, but other criteria were like some of the ones you mentioned.

ELLSON: The common reaction to programs that work in the laboratory and then fail when they get out into the school is that the program really wasn't any good. The other possibility is that the administration was poor; that is, the program was actually not duplicated. The administration of the program is a major factor. In many cases, a new program is almost necessarily difficult to administer, just because it is new. This is a very frustrating literature for

the reasons you are suggesting. Some of these studies were discontinued, just because the program was discontinued. It demonstrated success, but the funds were cut off.

WHITE: That was true in the AARC.

ELLSON: In other cases it demonstrated success, and the man in charge of it says, "Okay, I am done; I demonstrated it," and stops. There are a number of reasons why these are not continued. But my feeling is that they, at least altogether, are important enough that they ought to be followed up. There are so few successes like this, and we hear so much about educational research not having any consequences that I think at least we ought to follow them up as well as we can. Incidentally, it's extremely difficult. Most of the references I gave, you will not be able to find. Some are in my office. Most of them are fugitive literature. Some of them are government reports, and if you have ever tried to retrieve a government report four or five years after the study was completed, you know what I mean.

JACKSON: The 12 validated reading programs that you identified as components of the Right to Read program were not given any funds in the first place, so it is not a situation where, because funds were withdrawn from the central source, the programs did not operate. That's not accurate. The Office of Education requires a process which is called a dissemination review. Programs that are validated go through this dissemination review panel, and they then become eligible to apply for funds for diffusion. That means that a school district that would like to replicate a program can then get assistance for doing that.

This idea is not really dead; there is a lot of work that's being done. As a matter of fact, Far West Regional Labs has a contract, and they are working with diffusion. And they do have literature, a little book called Educational Programs That Work. There are the programs in reading, math, and so on that have gone through the dissemination review panel, and they do have longitudinal data that support their operation. The problem is that just because a program is validated at a particular point in time, does not mean that three years from now that program is operating at the same level. What we have found is that many times you have a dynamic person--in education we are in people business--who is able to convince the board, the administrators, and the teachers to do a particular thing. When that person leaves, that program changes. And so we have variables--sometimes just in the form of one person, one leader--that we are not able to control.

ELLSON: One other major problem I have found is that Title I has made it illegal to evaluate properly. They have a rule, a perfectly reasonable rule, but if you are interested in evaluation, it is very frustrating. Title I is really concerned with service programs, and the rules are stated in such a way that you cannot withhold a treatment from one group that needs it and give it to another. And there goes your control group. People say, "Oh, well, we will just use the national norms," but we don't want to go into that one.

CAMBOURNE: It's been my experience, in Australia and elsewhere that when say, two teachers tell you that they follow a certain program, when you actually get into the classroom and observe what they are doing, you find that although they are using the same labels, the way they actually distribute themselves across a classroom hour is very, very different. My question is: Would you advocate

research of good teaching at a level more molecular than the sort you have been talking about, where you actually observe the good teachers in action, and somehow try to map what it is that they are doing, rather than looking at the program at its completion, and saying, "Look, these kids were successful, but we really don't know what it is the teacher did, except that she taught program A?"

ELLSON: We do in many of these, because they are not done by professional teachers. You are saying that the professional teachers, being professionals, are doing the best job they can, and if they are not particularly happy with the program they are working with they would be expected, as professionals, to satisfy their service role by changing procedures.

CAMBOURNE: What I am saying is we really don't know what happens in classrooms. We don't have the kind of information on classrooms that an ethnographer or an anthropologist would have on societies.

ELLSON: Most of these studies were not done in classrooms. They were done by nonprofessionals, a number of whom were tutors. One advantage of nonprofessionals in research is that they will do what they are told.

END SESSION